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A PORTO RICAN BURIAL CAVE

By ROBERT T. AITKEN

DURING the months of June and July, 1915, the field work, of which this paper is the report, was performed by Dr. J. A. Mason, now of the Field Museum of Natural History, and the writer, under the direction of Dr. Franz Boas.¹ The portion of the work here described includes the excavation of a cave and of a so-called *juego de bola*. The cave in question was first visited by Dr. Mason earlier in the year when he happened to be in the neighborhood in connection with his work of collecting folklore. The cave is known to the natives simply as Antonio's *Cueva*, or as the *Cerro hueco*, and has for years been used as a place for drying beans and corn. It was known to have yielded human bones, as a certain citizen of Ponce, P. R., is reported to have removed the skeleton of a child at some indefinite time in the past. Dr. Mason, at the time of his first visit, merely scratched the surface at one or two places inside the cave, but even with such a superficial examination found a few scattered human bones. When, later in the year, opportunity was afforded for more extended archaeological work, this cave was selected as the first to be investigated because of the favorable impression gained from Dr. Mason's report of his first visit.

¹ The anthropological division of the Natural History Survey of Porto Rico, conducted jointly by the New York Academy of Sciences and the Porto Rican government, is under the direction of Dr. Boas, and was in 1915 conducted in several sections. The report of one section, by Dr. Herman K. Haeblerlin, has already appeared. ("Some Archaeological Work in Porto Rico," *American Anthropologist* (N. S.), vol. 19, no. 2.)

I wish here to express our indebtedness to Mr. Leopold B. Strube, of Utuado, Porto Rico, for his willing and able assistance in dealings with the country people, and in acting as agent for the party in Utuado throughout the summer. We are grateful also to Dr. Charles P. Berkey, of Columbia University, and to the late Mr. Gratacap, of the American Museum of Natural History, for furnishing the mineralogical and geological information used in this paper. The soil analyses and the information concerning the texture of the pottery were also supplied by Dr. Berkey.

The actual time spent in the excavation of the cave was about two weeks, the party during this time being camped in the mouth of the cave so as to lose no time in useless traveling. All the earth removed was thrown down the steep hillside, so that when the work was completed, the cave was entirely stripped of earth down to the calcite layer found to mark the limit of the specimen-bearing earth. All the material collected is at present at the American Museum of Natural History in New York.

THE CAVE

Antonio's *Cueva* is located in a limestone ridge in the *Barrio Caguana*, about ten miles west of the town of Utuado. The island of Porto Rico is made up of two different geological formations, volcanic and limestone. The dividing line between these two formations in the neighborhood of the cave is the Tanama river, distant about two miles in a direction almost due west, the course of the river at this point being nearly north-south. The hills and ridges of the limestone formation are everywhere fairly honeycombed with caves,¹ varying in size from the merest rock shelter to caverns of vast extent. Many of these caves are practically inaccessible, or at least are to be explored only with the aid of ropes, ladders, and artificial light. Some are rendered impassible by the presence in them of small or large bodies of water, or by their forming a portion of the course of creeks or rivers. Fortunately for the purposes of the expedition, this cave suffers from no such disadvantage. It is located about two hundred feet above the floor level of a small bowl-shaped valley, enters the hill in a direction nearly horizontal, and is perfectly dry. Moreover, the entrance is large and faces east, thus making the use of artificial light unnecessary. The comparative ease of access from the nearby roads and trails, and the presence in the neighborhood of an abundance of cheap labor, in combination with the above mentioned conditions, made the work of excavating the cave fairly simple.

At the present time the cave extends entirely through the

¹ Fewkes, "The Aborigines of Porto Rico and Neighboring Islands," *Twenty-fifth Annual Report Bureau of American Ethnology*, p. 87.

hill in an east-west direction, the extreme length being about one hundred twenty feet. A partial barrier of stalactites and stalagmites about sixty feet from the entrance divides the cave into two main chambers, of which the western is somewhat the larger. The western entrance seems to be of comparatively recent origin, having evidently been formed by the collapse of the roof at the western end of what until that time must have been a dark, damp, inside cavern. This supposition is sustained by the appearance of the fallen section of the roof, also by the fact that our investigation yielded not the slightest trace of human occupation or use of any sort of the western chamber.

The eastern entrance is about sixty feet wide, and is divided by a central pillar about twelve feet in diameter. The ceiling is about twenty-seven feet above the floor at this point. The sketches in figure 25 will give an idea of the size and relative positions of the different portions of the cave, and also of the stratification of the floor. Chamber *B* is only indicated, as excavations in it were fruitless. Chamber *A*, which yielded all the specimens found, is about sixty feet in width and length, the ceiling sloping up slightly from the entrance to a central point, about thirty feet above the floor, then rounding down to the walls, forming a rude dome. An upper gallery, marked *C* in figure 25, extends about forty feet in a westerly direction, terminating in a chimney-like aperture opening upon the precipitous western side of the hill. The gallery opens into the southwest wall at a height of about eighteen feet above the floor level. There were numerous niches and crevices about the walls, formed by the characteristic stalactites and stalagmites. The only one of any size is indicated in the sketch (fig. 25) at *D*, in the south wall.

The floor of chamber *A* slopes from the entrance down about one foot in six. The southern half is a terrace, approximately level, which terminates at the center of the cave, and drops abruptly to the level of the remainder of the floor. From this central line there is a slight upward slope to the north wall, forming a central trough, the south side of which is considerably higher than the north. In the survey of the cave accurate measuring devices were not

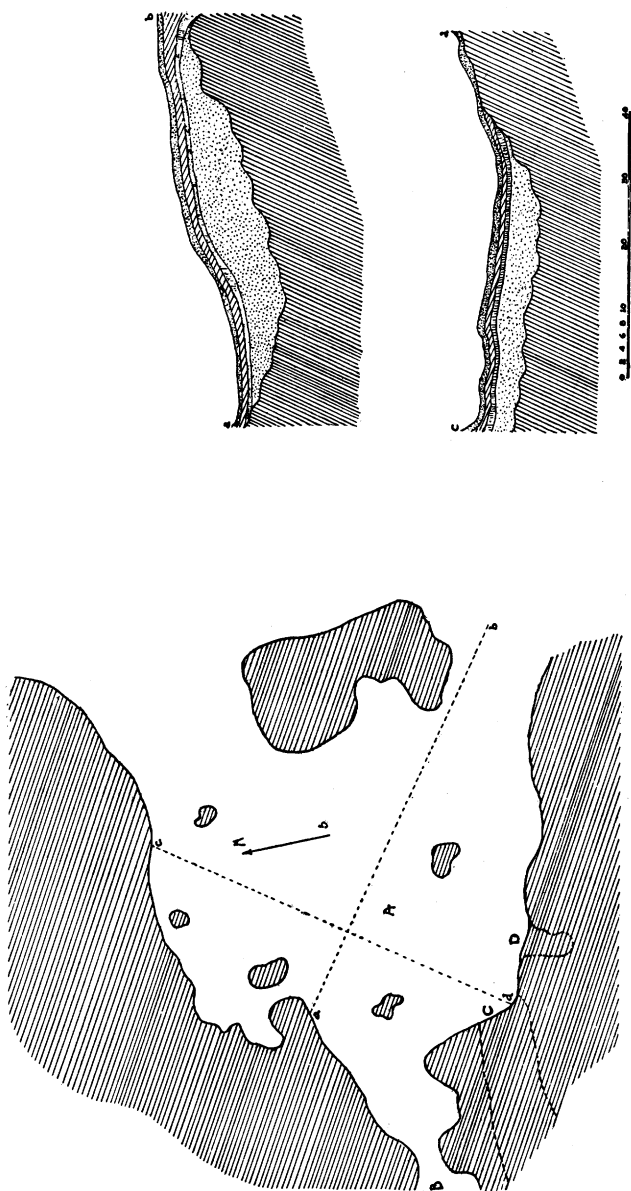


FIG. 25.—Groundplan and Cross sections of Antonio's Cueva.

available, and the bearings were taken with a small pocket compass, not corrected for deflection, so that distances and directions are only fairly close.

The recesses of the walls were first examined for possible hidden objects. But if there ever were any such, other hands than ours must have removed them long since, as not even a bit of potsherd rewarded our search. No paintings or rock-carvings of any sort were found on the walls, and the dryness of the cave at the present time makes it seem unlikely that there may be any such covered over by the drip from walls or ceiling. This dripping in the outer chamber (*A*) is so slight as to be negligible.

After this thorough search of the recesses, and a careful examination of the surface debris, the real excavation was begun. The method used was quite simple, and consisted in removing the floor a layer at a time. No trenching was done. The tools used were the long blades known as *machetes*, the universal tools of the Porto Ricans. For breaking through the calcite layers a pickax was necessary. For the actual uncovering of the specimens a small trowel was used, and much of the earth in these cases was removed with only the fingers as tools. This process was necessarily slow, but it was justified by results, as the remains found were so exceedingly fragile that only by this stripping off of the superposed material could they have been removed intact.

Work was begun simultaneously in two different places at the western end of Chamber *A*, on the terrace and at the barrier separating the two main chambers. The excavated earth, after careful examination for small objects, was carried to the mouth of the cave and dumped down the hill. In this manner the surface layer covering the entire floor was removed, without discoveries of importance. The only objects found were a few long exposed and well dried human bones, scattered through the litter, showing no evidence in their position of any attempt at interment; a few snail shells of different varieties, and some bat skeletons.

Scattered over the floor of the cave were sections of fallen stalactites, ranging in size from small bits to pieces weighing a hundred pounds or more. These sections were more or less im-

bedded in the surface layer, and were removed with it. When one of the larger of these was removed, it was found that the earth beneath it differed from the surrounding soil at the same depth. It was uniform with the surface soil, and not hard packed as was the soil at this depth elsewhere. Investigation showed that it covered human bones, which proved to be a complete human skeleton. This skeleton lay at a depth of about twenty inches from the original surface of the floor. In its immediate neighborhood the strata were undisturbed, and consisted of the surface soil and two successive layers of hard-packed, red-brown earth, separated by a layer of crystalline calcite two inches thick. A second calcite stratum lay below the lower layer of earth. This second calcite layer had been just broken through, the skeleton lying partly below, partly above. There was no stratification immediately above, the overlying earth being homogeneous to the surface. An examination of the upper calcite layer showed that an opening had been broken through it just large enough to allow the body to be placed in its final position.

The skeleton lay in the familiar contracted position, on the right side, facing north. It evidently had not been disturbed after interment, as all the bones were in their natural relative positions. All the major bones were recovered, a few of the small bones of the hands and feet being the only ones that were not found. All were in comparatively poor condition, being badly crumbled. The skull, however, was removed intact, the mandible with it. The skull has at this writing not been measured, but was apparently not artificially deformed, and was noticeably brachycephalic. The skeleton was that of a young adult. All the bones were after removal exposed to the air to dry and harden, then later packed in native cotton for shipment to the Museum in New York.

The above-mentioned burial was the first of twenty to be uncovered within the cave. The majority were of young adults or of children. The material has as yet not been arranged or measured, so little can be said at present regarding it. All of these burials were found at a depth of from fifteen to twenty inches, and in no case did the earth above show stratification. In some cases

the earth had been removed to the first calcite layer only in making the burial, while in others, as in the first, the calcite had been broken through, and the burial made at a lower level. The first burial was found at a point nearly in the center of Chamber A, at the bottom of the trough-like depression. This probably explains the poor condition of the remains as compared with the fairly good condition of many of those found at other points. Most of the water seeping into the cave or driven in in the course of the frequent rainstorms must have found its way down this central trough; consequently the soil underlying it was moist, and the remains only poorly preserved. All the remaining burials were along the north wall, some so near as to be almost touching, others, the last two found, lying in the center of the northern half of the cave entrance. There were two sets of exceptions to this rule. Four of the burials (collection numbers 4, 8, 12, 14) had been disturbed apparently by subsequent burials, so that it was difficult or impossible to tell exactly what the original position of the remains had been. Four others (17, 18, 19, 20), all of children, were lying in a north-south position, contracted, with the head at the south, facing east.

Two of the burials that had been disturbed (8 and 12) contained the bones of a child or infant together with the bones of an adult. No attempt was made at the time of excavation to ascertain sex, as the bones were in such a badly decayed condition that handling was dangerous. One burial (14) that had been disturbed lacked the skull and both femurs. In all the cases where the burials had been disturbed there were bones in excess of those belonging to the principal skeleton, suggesting that scant respect had been paid to earlier burials when they were encountered in digging new graves. Three of the burials yielded complete, intact skulls, mandibles included. It is possible that some of the other skulls are sufficiently complete to be reconstructed. The majority, however, are beyond repair. This was in several instances due to the fact that large blocks of calcite were frequently placed directly over the burials. The weight of these served in time to crush the more fragile bones.

After the last of these skeletons had been removed, the little remaining earth was excavated down to the clay, but no more remains were found. No remains of any kind were found in this clay, although this was excavated in one place to a depth of over five feet, at which depth the irregular blocks of calcite of what seemed to be the final rock floor of the cave were exposed. The upper gallery was carefully excavated, as were all the hollows and recesses of the walls, but without result. A large recess in the southern wall (*D* in figure 25), from which the child's skeleton already referred to was reported to have been taken, was excavated down to the solid limestone of the hill. A single human rib was found in the break in the calcite from which this skeleton is supposed to have been removed, and since it was the rib of a small child it lent color to the story.

In addition to the human remains above described, there were a few other objects found that may be important. Several portions of skulls, also several of the long bones of a strange variety of rodent were found in different layers, being apparently coeval with the human remains. Subsequent examination of these bones has shown the rodent to be of a new genus and species. These bones belong to the same animal as is described by Dr. J. A. Allen, of the American Museum of Natural History.¹ The remarks by Dr. Haeberlin, in his Porto Rico report² concerning the rodent bones found by him, which were the ones examined by Dr. Allen, apply likewise to those found in Antonio's *Cueva*.

There was a complete absence of all mortuary offerings. Nothing whatsoever seems to have been buried with or placed near the body. The graves were not marked in any way, unless the large blocks of calcite placed above some of them were intended as memorials. Possible exceptions to the first statement above may have been certain small flat bits of crystalline calcite, of which a dozen or more were found scattered through the upper layers of the floor. They were, as a rule, not associated with the burials, only one having been found near skeletal remains. Even in this

¹ *Annals of the New York Academy of Sciences*, vol. xxvii, pp. 17-32.

² Haeberlin, *American Anthropologist* (N. S.), vol. 19, no. 2, pp. 225-227.

case the association seemed accidental, as it lay several inches above the bones. These calcite bits were each from one to two inches square, and from a quarter to three-eighths of an inch thick. Many had been pierced, which suggests the possibility that they may have been worn as ornaments. Of these Dr. Berkey writes:

Specimens 25.0/1404 are crystals of calcite. They have been bored through, as shown by the straight hole, its uniform diameter (or slightly larger towards the ends), the independence of crystal axes and cleavage, and the crushed surface of the hole. The material may be wave-rolled fragments of a calcite vein in sea-eroded tuff.

In different places, and not associated with the burials, two fragments of stone were found, the shape of which led us strongly to suspect human workmanship. Dr. Fewkes declared that at the time of his investigation, 1904, there had been no mention made of the finding of any chipped or flaked implements in Porto Rico.¹ Yet a microscopic examination of these bits shows not only flaking, but a distinct secondary chipping along the cutting edge. These implements, if such they are to be considered, are quite small, being approximately five cm. long by one and a quarter cm. wide. These also were examined by Dr. Berkey, who says of them:

25.0/1403 is chert material (impure flint), microcrystalline silicon dioxide with some hydrated iron oxide present. They are artificially shaped. The whitish material on the angular face of the smaller piece is the original surface. The sharpness and freshness of the edges, which have not been worn since made, indicate a chipping or cracking (under influence of first heat, and then water) origin. The larger specimen shows this extra well. They are not possible erosion or weathering fragments.

Potsherds were conspicuous by their almost complete absence. Only a very few, about a dozen in all, small fragments were found, and these widely scattered. No complete pots were found, and the pieces were so fragmentary and so few that they cannot be assembled into a form sufficiently complete to show the shape of the whole. The photomicrographs (fig. 26), for which we thank Dr. Berkey, are of the two types of pottery found here. The following information concerning the two specimens was also furnished by Dr. Berkey.

¹ Fewkes, *Twenty-fifth Annual Report, Bureau of American Ethnology*, p. 91.

The field (25.0/1406) shows a complex mineral make-up, chiefly of angular grains of various sizes and composition, bound together in a comparatively small amount of matrix of darker (brown) substance. The larger and lighter-colored grains are chiefly fragments of feldspar and this is the chief identifiable constituent of the mixture. The dark grains probably have ferro-magnesium content which has been somewhat affected (turned brown) in the burning or aging of the ware. Occasional grains are practically black and represent still higher iron content. Rarely in other portions of the thin section fragments of rock rather than individual minerals may be seen; but in this ware such occurrences are evidently unusual. In certain parts of the specimen a slight streakiness or flowage structure may be seen, but this also is obscured and variable. The large amount of feldspathic content, the large proportion of mineral fragments of this sort, and the comparatively small proportion of matrix matter, together with the brown color of the matrix, are the microscopic characteristics of this particular specimen.

The following information relates to specimen 25.0/1425, figure 26.

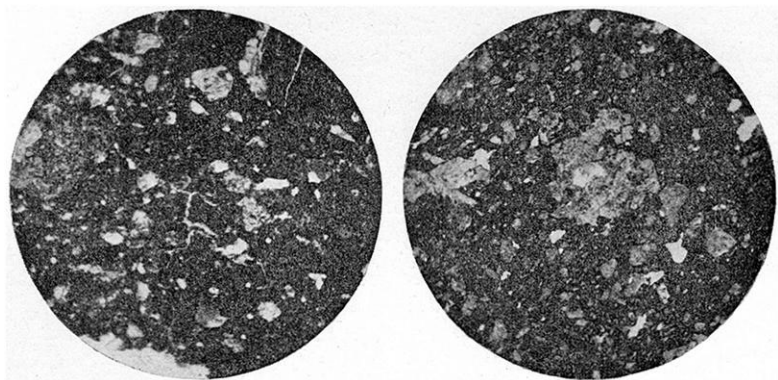


FIG. 26.—Photomicrographs of pottery from the cave; left 25.0/1425, right 2.50/1406.

This particular specimen (25.0/1425) contains very variable fragments, some of which are feldspathic mineral fragments; others are quartz, and still others are fragments of rock with aggregate composition. The binding matrix, representing the original clayey matter, is in comparatively large amount; and the proportion of mineral fragments is not nearly as large as in 25.0/1406. There is also much greater variety of quality of fragments in this specimen than in the other, and a greater variation in the condition of the material, that is, the matrix is much browner in some parts than in others of the field. There is no appreciable streakiness or flowage structure noted in this specimen. This is apparently a much less carefully selected mixture of material than 25.0/1406, or else it represents the manufacture of a locality where the more specialized quality of material was not available.

The sherds found showed little or no ornamentation. What little decoration there was was of the type described by Dr. Haeberlin in his report of the excavation of the *Cueva de la Seiba*,¹ that is, consisted of simple incised lines, with no scroll work or curvilinear design. A comparison of these specimens with those described by Dr. Haeberlin seems to show a relation between the pottery found in the *Cueva de la Seiba* (fig. 18, p. 228) and 25.0/1425, above, and between that found at the *juego* (fig. 19, p. 228) and 25.0/1406, above. Points common to the first group are: greater variety of size of grain; larger amount of clayey matter or matrix; greater variety of composition of grain. Points common to the second group are: comparatively small proportion of matrix material; great abundance of clear mineral matters; the apparently careful selection of materials. A comparison of the photomicrographs in figure 26, above, and figures 18 and 19, p. 228, of Dr. Haeberlin's report, will bring out clearly the resemblances between the two sets of specimens.

Reference has already been made to the stratification of the floor of the cave. Samples were taken from various places at different levels, which have since been examined by Dr. Berkey.

The top layer, after the surface litter of vegetable matter and guano was cleared away, was found to cover fairly uniformly the whole of Chamber A. Near the entrance this layer was high in plant remains, and contained mostly leaf fiber remnants, with a little charcoal. It was, however, highly calcareous. Farther in this organic material became less, practically disappearing a few yards from the entrance. The thickness of this top layer varied from almost nothing to eight or ten inches, and covered many of the smaller fallen pieces of stalactite.

Below the top layer came a series of alternate layers of hard packed earth and crystalline calcite or stalagma. These latter plates were in most places easily broken through with a pick, but in several places, especially near the walls, they were as much as five or six inches thick. The layers of earth varied in color, the darkest being a deep brown, the lightest an ash gray. Analyses

¹ Haeberlin, *American Anthropologist* (N. S.), vol. 19, no. 2, p. 228.

of samples from various of these layers show them to be of essentially similar composition, differing mainly in the proportion of their constituent elements. The average composition was lime powder, about 80 per cent., calcite crystals, about 10 per cent., the remainder varying percentages of charcoal fragments, gastropod shells, broken bits of crab shell, and grains of quartz. Some of the lime powder showed stains of limonite. The deeper layers contained a higher percentage of clay, and below the third, or in places the fourth, plate of stalagma, the soil was entirely clay. At one point this was excavated until over five feet had been penetrated, the solid rock floor of the cave being encountered at this depth.

The small deposits of charcoal and wood ash found at many points throughout the cave were evidently at least in part due to the charring and burning of the roots of trees and vines growing outside the cave. Brush fires were said to be of rather frequent occurrence, and traces were found in the cave of roots, partially burned, partially rotted. There were no stones showing the action of fire, and none of the ash deposits were large enough to suggest hearths.

JUEGO DE BOLA

After completely excavating the cave, attention was turned to the valley at the foot of the ridge in which the cave occurs. The cave is at an elevation of perhaps two hundred feet above the floor level of the valley, the surrounding hill tops being about as much higher again. The valley is bowl shaped, and has an area of not over one square mile. Directly below the cave are the remains of a *juego de bola*, or ball court, this term being applied generally in Porto Rico to the remains of prehistoric villages and settlements of all sorts.

The *juego* in question is quite small, occupying an area about three hundred feet square. It consisted of a main terrace, indicated at *A* in the sketch (fig. 27), with fairly definite boundaries, marked by a roughly semicircular wall or row of stones, surrounded on three sides by other smaller terraces, similarly partly bounded by irregular walls.

There were two small mounds, one near the main terrace, the other at the opposite end of the valley. The former was only

a small heap of earth, in which were found only a few bits of potsherd, and a few pebbles, the entire heap being only about two feet high and four in its longest diameter. The potsherds were similar to the two types found in the cave, described above. The second mound was less impressive than the first in its content, as it yielded

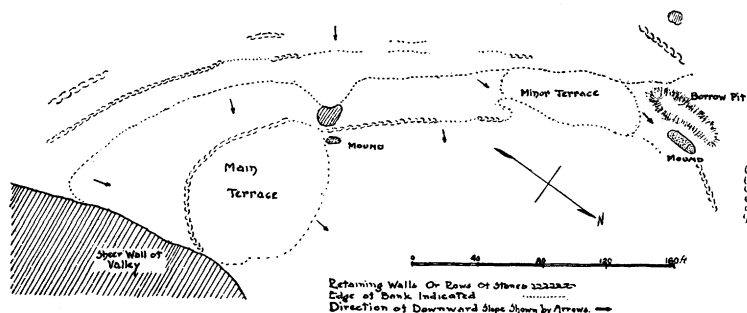


FIG. 27.—Groundplan of Jugo de Bola.

nothing whatever except earth exactly like the surface soil surrounding it. The dimensions of this mound were larger, it being about twenty by ten feet, and about four feet in height. There were a very few potsherds found scattered in various sheltered crannies near rocks on the different terraces. All were of the types already described. A few more pebbles were also found. These were of igneous rock, and must have been brought from a watercourse at some distance, as the nearest volcanic formation is at the Tanama river, two miles away.

There were numerous rows of stones heaped up with more or less regularity about the floor of the valley. Some of these were sufficiently well laid to form walls, the terraces mentioned being bounded on the lower sides by such retaining walls. Excavation behind these retaining walls showed conclusively that they were artificial, and that they had been in place a great many years. We were unable to thoroughly excavate the site, as it was covered with coffee shrubs, and the owner was averse to having any of these damaged. Just enough excavating was done to prove the walls artificial and probably prehistoric, and to examine the two mounds mentioned above.

The general disposition of the walls, terraces, and minor rows

of stones in relation to the main terrace led us to suspect that here was the site of a small village, with perhaps a dozen or more dwellings, each of the dwellings being located on its own little terrace, all grouped around the central terrace or court. This is of course mere speculation, as the excavation was too superficial to warrant any conclusions beyond that here was some sort of a settlement.

Aside from the potsherds and pebbles, the only object of prehistoric origin found was a hammerstone (fig. 28), picked up by Dr. Boas near the *juego*. This was the only implement of its sort found by us here or elsewhere. It is a rough pebble, 11.8 cm. in length by about 9 cm. in diameter, grooved about the center. The head was worn as from hard use. Mr. Gratacap thought it quartz porphyry (volcanic).

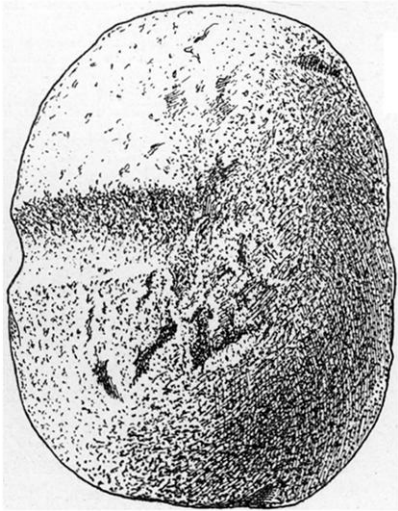


FIG. 28.—Hammerstone (25.0/1411) from Juego de Bola.

While working at the cave we were continually being informed of other caves where skeletal material was to be found, and on one occasion a fairly complete human skeleton was brought to us. No details could be learned as to its position and surroundings when found, beyond that it was but one of many to be found at that particular cave. A string of beads, said to have been associated with the remains, was also brought. These latter looked suspiciously modern. Time did not permit of our personal examination of the cave in question. Later we noted that a cave was located not far from a village site excavated by us, and the report was that skeletal material was to be found in this cave also. There is no question but that further investigation would yield remains well worth the excavation.